

SmartConnect Use Case:

D11 – Distribution Operations uses Smart Grid technology to enhance outage communication processes

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Document History

Revision History

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Approvals

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1. Use Case Description

1.1 Use Case Title

Distribution Operations uses Smart Grid technology to enhance outage communication processes.

1.2 Use Case Summary

This use case describes how the Consolidated Mobile Solution (CMS) could improve communications between SCE and its customers during outages. CMS empowers field workers to communicate the status of trouble orders and estimated restoration times (ERT) to SCE back office systems from the field in real-time. This updated outage status information would be accessible to customers who contact SCE via telephone or the company website. Customers would also have the option to receive updates from SCE via proactive e-mails, text messages, or phone calls. The business value of these improved communication processes includes reduced costs and increased customer benefits.

1.3 Use Case Detailed Narrative

Outages represent a significant source of customer frustration and dissatisfaction. One factor contributing to this dissatisfaction is when the utility is unable to provide satisfactory information on the expected duration of the outage to customers. During outages 30% of customers call more than once because they either are not satisfied with the information they received during the first call, or because SCE exceeded the estimated restoration time (ERT). Proactively communicating outage status and restoration information would improve customer satisfaction scores and reduce the number of outage-related customer calls.

The current process field workers use to communicate outage status information to back office systems could be improved. This process involves radioing outage status information from the field to the Distribution Operations Center (DOC). The DOC then manually enters the information into the Outage Management System (OMS), which populates other back office systems and updates the Outage Alert Notes (OAN). This manual process can cause both delays and inaccuracies in the information made available to Customer Services Representatives (CSRs), the utility website, and other outbound customer communication channels. Improvements to this process could enable CSRs, the Voice Response Unit (VRU) and SCE.com to provide customers with more accurate and up-to-date information on estimated restoration times and outage status.

This use case describes how a Consolidated Mobile Solution (CMS) could improve communications between SCE and its customers during outages. CMS empowers field workers to communicate outage status (including ERT) to SCE back office systems from the field in real-time. At each of the following critical workflow points, the field worker would use a “Status Button” on the CMS device to automatically update the outage status in OMS, the Outage Alert Note, and other back office systems. The following represent the critical steps where an automatic update would occur:

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1. Acknowledge receipt of the trouble order.
2. Indicate “En Route” to the outage site.
3. CMS sends message that the field worker is “On Site” when the GPS-enabled vehicle senses it is in the vicinity of the outage site.
4. Assess work requirements and determine the ERT.
5. Validate or update the ERT based on work progress.
6. Complete work and restore power.

Since the Outage Alert Note (OAN) would be updated automatically from the field via CMS, customers could then have the option of receiving outage status updates from SCE via proactive e-mails, text messages, or phone calls. Customers could customize their personal communication profiles, specifying the preferred communications channels and messaging frequency. For example, a customer might only want to receive one phone call with an estimated restoration time (ERT). The same customer might be willing to receive more frequent text messages if there is an update to the ERT (e.g. the power will be restored an hour earlier than initially reported). Customers could also receive these communications to more than one location. This might include multiple mobile phones for a multi-person household, or a secondary notification to a relative. For business customers this could include other customer-authorized personnel or agents.

Business Value

The benefits of using Smart Grid technology for the outage communication processes include the following:

1. **Reduced Costs:**
 - a. **Avoided Outage Calls:**
 - i. **First Calls:** During planned outages SCE can reduce the number of customer calls by proactively communicating planned outage information prior to the outage date. During unplanned outages SCE can reduce the number of calls if the SmartConnect meter sends “last gasp” messages to the In-Home Display (IHD).
 - ii. **Multiple Calls:** During outages 30% of customers call more than once because they either are not satisfied with the information they received during the first call, or because SCE exceeded the estimated restoration time (ERT). By providing more accurate and current outage status information during their first call and by proactively communicating outage status during the outage, SCE can reduce the number of times customers call more than once.
 - b. **Labor Efficiencies:** Using CMS to automatically update the Outage Alert Note (OAN) would reduce manual processing activities at the Distribution Operations Center. Timely and accurate updates to OANs would also make Customer Service Representatives (CSR) and the Voice Response Unit (VRU) more effective and efficient with customer calls. Finally, the restoration verification process would make field workers more productive. Verifying restoration prior to departure from the outage site would eliminate the need to make a second trip if power was not restored (see use case D4).

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- c. **Resource Flexibility:** Customers who call SCE and are satisfied with the information they obtain are typically more understanding in terms of the outage length. This could permit greater operational flexibility during storms or other outage periods when SCE is highly resource constrained.
- d. **Customer Notifications:** SCE may save on expenses related to informing customers of planned outages via traditional means such as door hangers, mailings, outbound calls, knocking on doors, etc.

2. Increased Customer Benefits:

- a. **Non-SCE Outages:** SCE could offer its communications channel to third parties as a service. One example is a local cable company that needs to notify customers of outage statuses.
- b. **Safety Notifications:** SCE could broadcast weather warnings and other notifications to promote customer safety.
- c. **Promotions:** SCE could promote awareness of programs and services during an outage (movie tickets, solar energy advertisements, etc.).
- d. **Improved Accuracy and Timeliness of Information:** Customers who call SCE during an outage often call more than once. On average, those who call a second time have lower customer satisfaction. Thus, providing more accurate ERT information during the customer's initial call would increase customer satisfaction. In addition, by proactively calling customers with updated outage status and ERT information, SCE can also increase customer satisfaction.
- e. **Communications Flexibility:** Customers would have an option to choose the communications channels for outage-related messages, and to authorize secondary notifications to others (e.g. family members, authorized employees for commercial accounts, etc.).
- f. **Planning around Outages:** Customers with better outage status information could plan around the outages. Residential customers might want to leave home for errands. Likewise, businesses with better information could mitigate productivity losses by more effectively managing their operations and workforce.

1.4 Business Rules and Assumptions

- The full vision and high level requirements for the Consolidated Mobile Solution (CMS) are captured across use cases D10 and D11. However, individual requirements are independent of one another for the purpose of a phased implementation of CMS.
- OMS is the source to the other back office systems that require outage status information.
- The process described in this use case for communicating Outage Alert Note (OAN) updates to customers is the same for planned outages and unplanned outages. The only difference is timing (i.e. advanced notifications is provided to customers in the case of planned outages.)
- CMS is a common field tool for both Trouble Workers and Line Crew personnel; different capabilities may be available to these different users based on job classification, but the system itself is fundamentally the same.
- Only those customers who have opted-in to receive proactive notifications from the utility receive the OAN updates (for both planned and unplanned outages).
- Planned outages would all receive proactive prior notice communications from SCE, advising them of the upcoming planned outage.
- In the event of transmission or substation outages, the Dispatcher, rather than CMS, manually updates the status of work orders and OAN, determines estimated restoration times (ERT), and performs updates to OMS.
- Customers do not require perfect estimates of restoration time.
- Messages are sent to the customer in near real-time.
- In-Home Displays (IHD) are widely available with high customer adoption rates, and are thus the default option for customer notifications. However, other communication channel options are also available, including e-mail, text messages and phone calls.
- IHD are able to receive and display outage-related messages in the absence of grid power.
- Estimated restoration times (ERTs) are only performed by field personnel for non-storm outages. During storms, ERTs are generated by the Storm Centers rather than field personnel.

2. Actors

Describe the primary and secondary actors involved in the use case. This might include all the people (their job), systems, databases, organizations, and devices involved in or affected by the Function (e.g. operators, system administrators, customer, end users, service personnel, executives, meter, real-time database, ISO, power system). Actors listed for this use case should be copied from the global actors list to ensure consistency across all use cases.

<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
Consolidated Mobile Solution (CMS)	System	A collection of remote field tools, mobile software, and the associated communications network infrastructure used by field workers. CMS shall be configured to be role-based, providing varying functionalities depending on the user.
Customer	Person	Residential, commercial and governmental energy user that has a contract with the utility to receive electrical service from the utility and has an advanced meter installed. The customer may or may not participate in programs provided by the utility including pricing events, load control, distributed generation, or outage notifications.
Customer Relationship Management System (CRM)	System	The Customer Relationship Management System (CRM) manages SCE's contact with its customers. CRM stores customer information and is used to support the various processes involving customer contact. This information can be accessed, entered or updated by certain employees and back office systems.
Dispatcher	Person	In case of an outage (power failure) the Dispatcher looks at the OMS system to determine the problem and sends Trouble Workers to investigate and perform repairs.
Line Crew	Persons	Performs manual operation of field devices, repair and construction work; works on power system equipment in the field, as instructed by work orders and as authorized by the Distribution Operator or Crew Dispatcher to fix a fault; informs Crew Dispatcher or Distribution Operators of progress.
Outage Alert Note (OAN)	Notification	Outage Alert Notes are notes that are available to customers via Customer Service Representatives, the Voice Response Unit (VRU) and the utility website. The note includes the estimated restoration time (ERT), other status information such as the field worker status (e.g. dispatched, en-route, or on site), and possible outage causes. These notes are currently created manually. CSRs and the VRU can provide this information to customers who call SCE. OANs are generated in OMS, and may be updated by field workers via CMS. CMS would transmit updates to the Outage Management System (OMS), which updates the OAN and transmits the updated

<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
		information to the Customer Service System (CSS). This information would be available to Customer Service Representatives for customer calls. It would also be used as a basis for other outbound customer communications.
Outage Management System (OMS)	System	A distribution management system which uses an analysis engine to identify the location of outages. It correlates end-point outages and infers root causes by identifying common failure points grouped upstream, using information from the GIS, CSS, SCADA and SmartConnect systems, and customer calls. An OMS helps in reducing outage duration and assists with restoration plans. Determination of outage locations is based on the system's knowledge of the power system topology.
Status Button		The Status Button is a shortcut button on the Consolidated Mobile System device (CMS) that Line Crews and Troublemens use to communicate work order and outage information from the field to utility back office systems. For example, the Trouble Worker would use the Status Button to communicate "En Route" status, and provide an estimated time of arrival at the job site. It would also be used to provide updates to the estimated restoration time (ERT). The "Status Button" may include a drop down menu for quick information entry.
Trouble Worker	Person	Field personnel who act as "first responders" to field issues which need to be worked on or evaluated to determine the crews necessary to perform the work.
Work Assignment Coordinator (WAC)	Person	The individual within Distribution Construction and Maintenance (DC&M) that determines ERTs and schedules Line Crews to perform outage restoration work. Troublemens can typically perform 80% of non-storm outage restoration work, with the remainder performed by Line Crews. During storm-related outages the Line Crews perform the majority of restoration work. If the Trouble Worker cannot restore power by himself, he estimates the Line Crew requirements (time and number of personnel) and communicates this to the WAC. Communication between the Troublemens and WAC is currently performed via radio, which results in information having to be manually entered into OMS. This costs both time and resources, delays the information from being received into the CSS system and, ultimately, causes delays in information being made available to CSRs and customers.
Work Management System (WMS)	System	The Work Management System (WMS) generates, prioritizes and schedules work orders, and delivers them to the field worker via CMS. SAP is the system that currently performs this function at SCE.

3. Step by Step analysis of each Scenario

Describe steps that implement the scenario. The first scenario should be classified as either a “Primary” Scenario or an “Alternate” Scenario by starting the title of the scenario with either the work “Primary” or “Alternate”. A scenario that successfully completes without exception or relying heavily on steps from another scenario should be classified as Primary; all other scenarios should be classified as “Alternate”. If there is more than one scenario (set of steps) that is relevant, make a copy of the following section (all of 3.1, including 3.1.1 and tables) and fill out the additional scenarios.

3.1 Primary Scenario: Field worker communicates unplanned outage restoration status to update distribution operations and customer contact channels

This scenario describes how field workers use the Consolidated Mobile Solution (CMS) device to improve communications between SCE and its customers during unplanned outages. CMS empowers field workers to communicate the status of trouble orders and estimated restoration times (ERT) to SCE back office systems from the field in real-time. This updated outage status information is accessible to customers who contact SCE via telephone or the company website. Customers also have the option of receiving outage status updates from SCE via proactive e-mails, text messages, or phone calls. The business value of these improved communication processes includes reduced costs and increased customer benefits.

Triggering Event	Primary Actor	Pre-Condition	Post-Condition
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
Outage Management System (OMS) confirms there is an outage.	OMS		Service is restored.

3.1.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

Step #	Actor	Description of the Step	Additional Notes
#	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.</i>
1	Customer	Customer receives notification from SCE via the In-Home Display (IHD), confirming SCE is aware of the outage and providing a qualitative measure of the outage magnitude.	<p>The customer's IHD has battery power, enabling it to receive a "last gasp" notification directly from the SmartConnect meter. Records of all such individual customer communications are stored in the Customer Relationship Management System (CRM).</p> <p>The default communications channel is the IHD. However, customers shall also have the option to pre-select other communications channels (e-mail, text message or phone call).</p> <p>The qualitative measure of outage magnitude will indicate whether it is an area, neighborhood, or isolated problem.</p> <p>This initial outage confirmation notification shall include a telephone number that customers may call for additional outage information. For example, a VRU might be able to</p>

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
			provide customers with estimated restoration times (ERT), if available, outage magnitude, and other information about the trouble order status (i.e. field worker “En Route” or “On Site”.)
2	Dispatcher	Dispatcher assigns trouble order and dispatches the Trouble Worker via CMS.	See use case D10 for further discussion of CMS. The trouble order would also include any relevant information the Dispatcher knows about the outage.
3	Trouble Worker	Trouble Worker acknowledges receipt of trouble order via the CMS device, moving the trouble order to “Dispatched” status and automatically updating the Outage Alert Note (OAN) and other back office systems.	The Trouble Worker acknowledges receipt of the trouble order via the CMS device. The CMS device includes a “Status Button” that facilitates rapid and simple status updates. The trouble order is moved to “Dispatched” status. The change of status is sent to the back office systems (e.g. OMS, CSS, WMS and CRM), and the Outage Alert Note (OAN) is automatically updated. The OAN is available to Customer Service Reps (CSRs), Voice Response Unit (VRU) and SCE website. This step does not necessarily mean the Trouble Worker is en route. It simply means he has received the trouble order.
4	Trouble Worker	Trouble Worker begins travel to job site and changes trouble order status to “En Route” via CMS device. The OAN and other back office systems are automatically updated.	The Trouble Worker updates the trouble order status via the CMS “Status Button”. The trouble order status update is automatically sent by CMS to the back office systems (e.g. OMS, CSS, WMS and CRM), and the OAN is automatically

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
			updated. If the Trouble Worker does not update the status to “En Route” CMS will send a status update when the truck detects it is within proximity of the outage location (Step 6).
5	Customer	If subscribed, the customer receives message indicating Trouble Worker is “En Route” to the outage location.	Communication sent according to pre-defined customer preferences. During outages affecting an individual customer, the Trouble Worker would continue the current practice of calling the customer while “en route”.
6	CMS	CMS changes trouble order status to “On Site” when the vehicle’s GPS detects it is within proximity of the job site.	“On Site” refers to the outage site, as determined by OMS.
7	Customer	If subscribed, the customer receives message indicating Trouble Worker is “On Site” at the outage location.	Communication sent according to pre-defined customer preferences.
8	Trouble Worker	Trouble Worker arrives “On Site”, identifies the problem and attempts to complete the necessary repairs.	
8.1	Trouble Worker	If the Trouble Worker is able to restore power he updates the trouble order status and proceeds to Step 16.	
8.2	Trouble Worker	If the Trouble Worker cannot perform the restoration, he updates CMS by assessing the repair requirements, preparing a materials list, estimating the repair time, initiating a new work order for Line Crew dispatch, and determining an estimated restoration time (ERT). CMS transmits this information to the back office systems.	Work Management System (WMS) would determine or adjust the ERT based on factors such as the outage location, traffic, number of workers on call, historical average response and repair times, and Line Crew response rates. The Trouble Worker could access this application via CMS to determine the ERT in the field. He would be able to override this system-generated ERT based on his knowledge of specific circumstances in the field. The new work order would be linked

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
			to the original trouble order.
9	Customer	If subscribed, the customer receives a message indicating the updated ERT.	These messages are only sent to customers that have subscribed to receive them. ERTs for would only be estimated for non-storm outages.
10	Work Assignment Coordinator (WAC)	Work Assignment Coordinator confirms Line Crew availability and schedules work order.	
11	Line Crew	Line Crew arrives on site and updates the estimated ERT via CMS.	All ERT updates are automatically sent by CMS to the back office systems (OMS, CSS, WMS and CRM), and the OAN is automatically updated. CRM then sends the customer a status update message according to their predefined preferences.
12	Customer	If subscribed, the customer receives a message indicating the updated ERT.	These messages are only sent to customers that have subscribed to receive them.
13	Line Crew	Line Crew continues to validate and update the estimated ERT via CMS, as necessary, as they perform the outage restoration work.	All ERT updates are automatically sent by CMS to the back office systems (OMS, CSS, WMS and CRM), and the OAN is automatically updated. CRM then sends the customer a status update message according to their predefined preferences. CMS would automatically prompt the field worker to validate the ERT 30 minutes prior to the ERT. For example, if the ERT is 1:30PM, CMS would prompt the field worker to validate the ERT at 1:00PM.

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
14	Customer	If subscribed, the customer receives message(s) indicating the updated ERT.	
15	Line Crew	Line Crew completes work and updates work order status via CMS.	
16	CMS	CMS updates the OAN and back office systems (OMS, CSS, CRM), and OMS performs the SmartConnect-enabled restoration verification as described in use case D4 in which OMS pings nearby meters (known to be out) to verify restoration.	
17	Customer	Customer receives “Power Restored” message which lists the outage cause and duration, and an apology.	If power is not restored, the customer contacts utility by replying to the e-mail or text notification, or via the website or telephone number listed on the initial outage message (from Step 1).

3.2 Scenario: Field worker communicates planned outage restoration status to update distribution operations and customer contact channels

This scenario describes the SCE communications process during planned outages. This includes communications between SCE and the customer, and between SCE field crews and SCE back office systems. Prior to a planned outage, SCE proactively communicates planned outage information to the customer via the In-Home Display (IHD). During the planned outage, CMS empowers field workers to communicate the status of work orders and estimated restoration times (ERT) to SCE back office systems from the field in real-time. This updated outage status information is accessible to customers who contact SCE via telephone or the company website. Customers also have the option of receiving outage status updates from SCE via proactive e-mails, text messages, or phone calls. The business value of these improved communication processes includes reduced costs and increased customer benefits.

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
SCE determines there is a need for a planned outage.	OMS		Service is restored.

3.2.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.</i>
1	Customer	Customer receives advance notification from SCE of the planned outage event, via the In-Home Display (IHD).	The advanced notification includes the date and time of the planned outage, as well as a brief explanation of the reason for

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
			<p>the planned outage.</p> <p>Customers may opt to receive notifications from SCE via an outbound phone call (VRU), e-mail, text message, or the In-Home Display. The default communications channel is the IHD.</p> <p>Records of all such individual customer communications are stored in the Customer Relationship Management System (CRM).</p>
2	Work Assignment Coordinator (WAC)	Work Assignment Coordinator confirms Line Crew availability and schedules work order.	
3	Line Crew	Line Crew arrives on site, initiates planned outage, and updates the estimated restoration time (ERT) via CMS.	All ERT updates are automatically sent by CMS to the back office systems (OMS, CSS, WMS and CRM), and the OAN is automatically updated. CRM then sends the customer a status update message according to their predefined preferences.
4	Outage Management System (OMS)	Outage Management System (OMS) confirms the onset of the planned outage and provides a qualitative measure of outage magnitude to the customer.	<p>The customer's IHD has battery power, enabling it to receive a "last gasp" notification directly from the SmartConnect meter.</p> <p>This initial outage confirmation notification shall include a telephone number that customers may call for additional outage information. For example, a VRU might be able to provide customers with ERT, if available, and outage magnitude.</p> <p>The qualitative measure of outage magnitude will indicate whether it is a neighborhood, area, or isolated outage.</p>

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
5	Customer	If subscribed, the customer receives a message confirming the onset of the planned outage and indicating the updated ERT.	
6	Line Crew	Line Crew continues to validate and update the estimated ERT via CMS, as necessary, as they perform the planned outage work.	All ERT updates are automatically sent by CMS to the back office systems (OMS, CSS, WMS and CRM), and the OAN is automatically updated. CRM then sends the customer a status update message according to their predefined preferences. CMS would automatically prompt the field worker to validate the ERT 30 minutes prior to the ERT. For example, if the ERT is 1:30PM, CMS would prompt the field worker to validate the ERT at 1:00PM.
7	Customer	If subscribed, the customer receives message(s) indicating the updated ERT.	
8	Line Crew	Line Crew completes work and updates work order status via CMS.	
9	CMS	CMS updates the OAN and back office systems (OMS, CSS, CRM).	
10	OMS	OMS performs the SmartConnect-enabled restoration verification as described in use case D4 in which OMS pings nearby meters (known to be out) to verify restoration.	
11	Customer	Customer receives “Power Restored” message which lists the outage duration, and an apology.	If power is not restored, the customer contacts utility by replying to the e-mail or text notification, or via the website or telephone number listed on the initial outage message (from Step 1).

4. Requirements

Detail the Functional, Non-functional and Business Requirements generated from the workshop in the tables below. If applicable list the associated use case scenario and step.

4.1 Functional Requirements

<i>Req. ID</i>	<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
1	The Customer Relationship Management System (CRM) shall log confirmed outages for a given customer.	1 & 2	Scenario 1: 1 Scenario 2: 4
2	SCE shall be able to send customer notifications to acknowledge the outage.	1 & 2	Scenario 1: 1 Scenario 2: 4
3	SCE shall be able to send customer notifications that include an indication of outage magnitude (e.g. whether the outage was an area, neighborhood or isolated problem).	1 & 2	Scenario 1: 1 Scenario 2: 1,4
4	SCE shall be able to send customer notifications that include a phone number for customers to call for additional outage information.	1 & 2	Scenario 1: 1 Scenario 2: 4
5	In-Home Displays (IHDs) shall be able to receive “last gasp” messages from SmartConnect meters for customer viewing.	1 & 2	Scenario 1: 1 Scenario 2: 4
6	IHDs shall be able to receive notifications for planned outages in advance of the outage event.	2	1
7	Planned outage notifications shall include the planned outage date and time.	2	1
8	Planned outage notifications shall include the reason for the planned outage.	2	1
9	In the absence of power to the SmartConnect meter, the IHD shall be capable of receiving messages directly from an alternative source (cell relay, wide area broadband, etc.).	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11

<i>Req. ID</i>	<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
10	SCE shall be able to send customer notifications that include estimated restoration times (ERT).	1 & 2	Scenario 1: 9,12,14 Scenario 2: 5,7
11	SCE shall be able to send customer notifications for any status changes or updates to Outage Alert Notices (OANs).	1 & 2	Scenario 1: 5,7,12,14,17 Scenario 2: 5,7,11
12	The IHD shall be the default channel for outage communications to customers (e.g. if the customer does not customize their communications preferences, all outage communications will go to the IHD).	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
13	SCE shall be able to send customer notifications according to customer communication preferences (as stored in CRM).	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
14	CRM shall provide suggested customer “notification bundles” for customers to subscribe to.	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
15	CRM “notification bundles” shall be based on expected preferences for different customer groups (based on surveys or, if available, historical customer selection data).	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
16	CRM shall allow outbound customer communication preferences to be configurable by channel type. For example, a customer may be willing to receive multiple frequent text messages, but may only want one phone call. Alternatively, a customer may not want to receive calls at inconvenient times, but they may be willing to receive an e-mail or text message at these times.	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
17	CRM shall allow outbound customer communication preferences to be configurable by notification type. For example, a customer may want to receive a notification only when power has been restored (but no other ERT updates).	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,

<i>Req. ID</i>	<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
			11
18	CRM shall allow customers to select multiple channels for receiving communications from SCE (text message, e-mail, IHD, or phone call).	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
19	CRM shall allow for customer notification preferences to be updated through a web interface.	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
20	CRM shall allow for customer notification preferences to be updated through a Customer Service Representative (CSR) interface.	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
21	CRM shall log occurrences of customer notifications via all channels.	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
22	Customer Account Representatives shall be able to subscribe to OAN notifications for commercial and industrial customers.	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
23	CRM shall store the customer preferences for outbound communications from SCE.	1 & 2	Scenario 1: 1,5,7,9,12,14,17 Scenario 2: 1,5,7,11
24	The Outage Management System (OMS) shall be integrated with the Customer Relationship Management System (CRM) to enable delivery of customer notifications	1 & 2	Scenario 1: 1,5,7,9,12,14,17

<i>Req. ID</i>	<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	according to customer communication method preferences.		Scenario 2: 1,5,7,10,11
25	The Consolidated Mobile Solution (CMS) shall contain a “Status Button” that field workers can utilize to initiate quick updates to the trouble order (including ERT status).	1 & 2	Scenario 1: 3,4,8,11,13 Scenario 2: 3,6
26	CMS shall be integrated with OMS such that it possesses all information entered into CMS by field workers in the field.	1 & 2	Scenario 1: 3,4,6,8,8.2,11,13,15 Scenario 2: 3,6,8
27	Field workers shall be required to update the trouble order status (acknowledgement of trouble order received, en route to job-site, etc.) and ERT estimates via CMS.	1 & 2	Scenario 1: 3,4,8,11,13,15 Scenario 2: 3,6,8
28	CMS shall be able to update trouble order status (including ERT estimates) in SCE back office systems (OMS, CSS, WMS and CRM).	1 & 2	Scenario 1: 3,4,6,8,8.2,11,13,16 Scenario 2: 3,6,9,10
29	CMS shall route all trouble orders and ERT updates to relevant back office systems (OMS, CSS, WMS and CRM).	1 & 2	Scenario 1: 3,4,6,8,8.2,11,13,16 Scenario 2: 3,6,9,10
30	OMS shall be able to receive data from CMS.	1 & 2	Scenario 1: 3,4,6,8,8.2,11,13,16 Scenario 2: 3,6,9,10
31	OMS shall be able to process data received from OMS (i.e. update the OANs).	1 & 2	Scenario 1: 3,4,6,8,8.2,11,13,16 Scenario 2: 3,6,9,10
32	Outage Alert Notes (OANs) shall be automatically updated when field workers update trouble orders via CMS.	1 & 2	Scenario 1: 3,4,6,8,8.2,11,13,16

<i>Req. ID</i>	<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
			Scenario 2: 3,6,9,10
33	Updated OANs shall be available for CSRs and the VRU. This is necessary to enable SCE to provide current outage information to customers.	1 & 2	Scenario 1: 3,4,6,8,8.2,11,13,16 Scenario 2: 3,6,9,10
34	The CMS GPS function shall be able to detect when field workers are in the job-site vicinity.	1	6 & 11
35	CMS shall be able to automatically update the OAN to “On Site” when the field worker is detected in the job-site vicinity.	1	6 & 11
36	CMS shall be able to generate new work orders.	1	8.2
37	CMS-generated work orders shall be linked to an original trouble order (if applicable).	1	8.2
38	The Work Management System (WMS) shall consider crew availability when calculating ERTs.	1	8.2
39	WMS shall be able to consider material availability when calculating ERTs.	1	8.2
40	WMS shall be able to consider standard hours for repairs when calculating ERTs.	1	8.2
41	WMS shall be able to consider historical average response and repair times when calculating ERTs.	1	8.2
42	WMS shall be able to consider travel time when calculating ERTs.	1	8.2
43	WMS shall be able to consider other local factors when calculating ERTs.	1	8.2
44	CMS shall enable Trouble Workers to override WMS-calculated ERTs.	1	8.2
45	CMS shall be able to automatically prompt field workers to validate the ERT 30 minutes prior to the ERT.	1 & 2	Scenario 1: 13 Scenario 2: 6
46	The utility shall be able to communicate ERT updates to customers only when the change is greater than 30 minutes.	1 & 2	Scenario 1: 14 Scenario 2: 7
47	SCE shall be able to send “power restored” notifications to customers upon verification of service restoration.	1 & 2	Scenario 1: 11

<i>Req. ID</i>	<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
			Scenario 2: 11
48	“Power restored” notifications shall include outage summary information (e.g. outage cause and duration).	1 & 2	Scenario 1: 17 Scenario 2: 11
49	Outage communications shall be automated (to support paging and other internal communication capabilities).	1 & 2	All

4.2 Non-functional Requirements

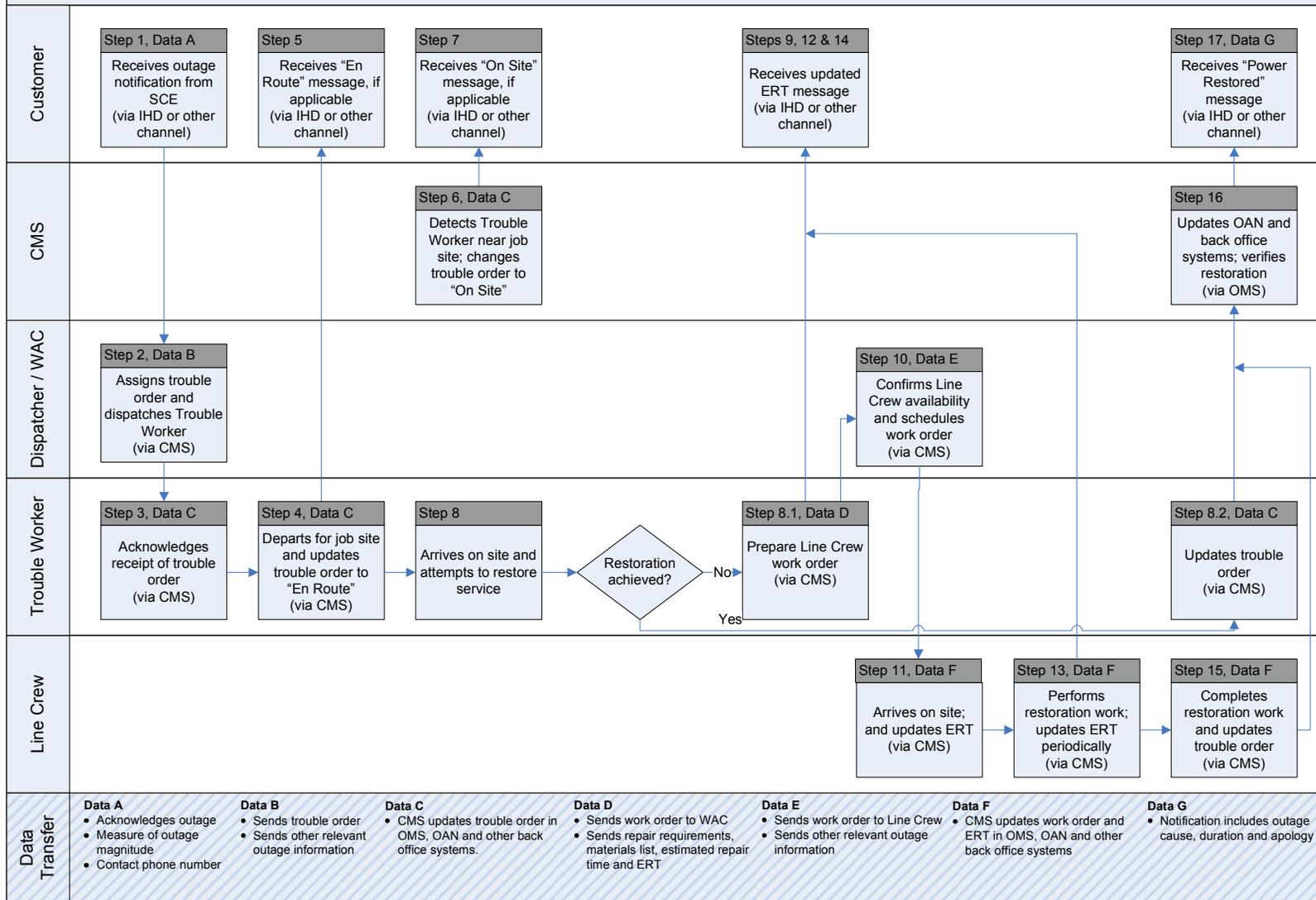
<i>Req. ID</i>	<i>Non-Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
1	CMS shall be able to transmit trouble order and ERT information to relevant back office systems on a real-time basis (within 10 minutes).	1 & 2	Scenario 1: 3,4,6,8,11,13,15 Scenario 2: 3,6,8
2	The Dispatcher shall be able to transmit trouble orders and other job-site specific information to the Trouble Worker on a real-time basis (within less than one minute).	1	2
3	The Customer Relationship Management System (CRM) shall enable customers to select among multiple communications channels.	1 & 2	Scenario 1: 1,5,7,12,14,17 Scenario 2: 1, 5,7,11
4	CRM shall enable multiple receivers of notifications (e.g. designated commercial customer employees or agents, residential customer family members, etc.).	1 & 2	Scenario 1: 1,5,7,12,14,17 Scenario 2: 1, 5,7,11

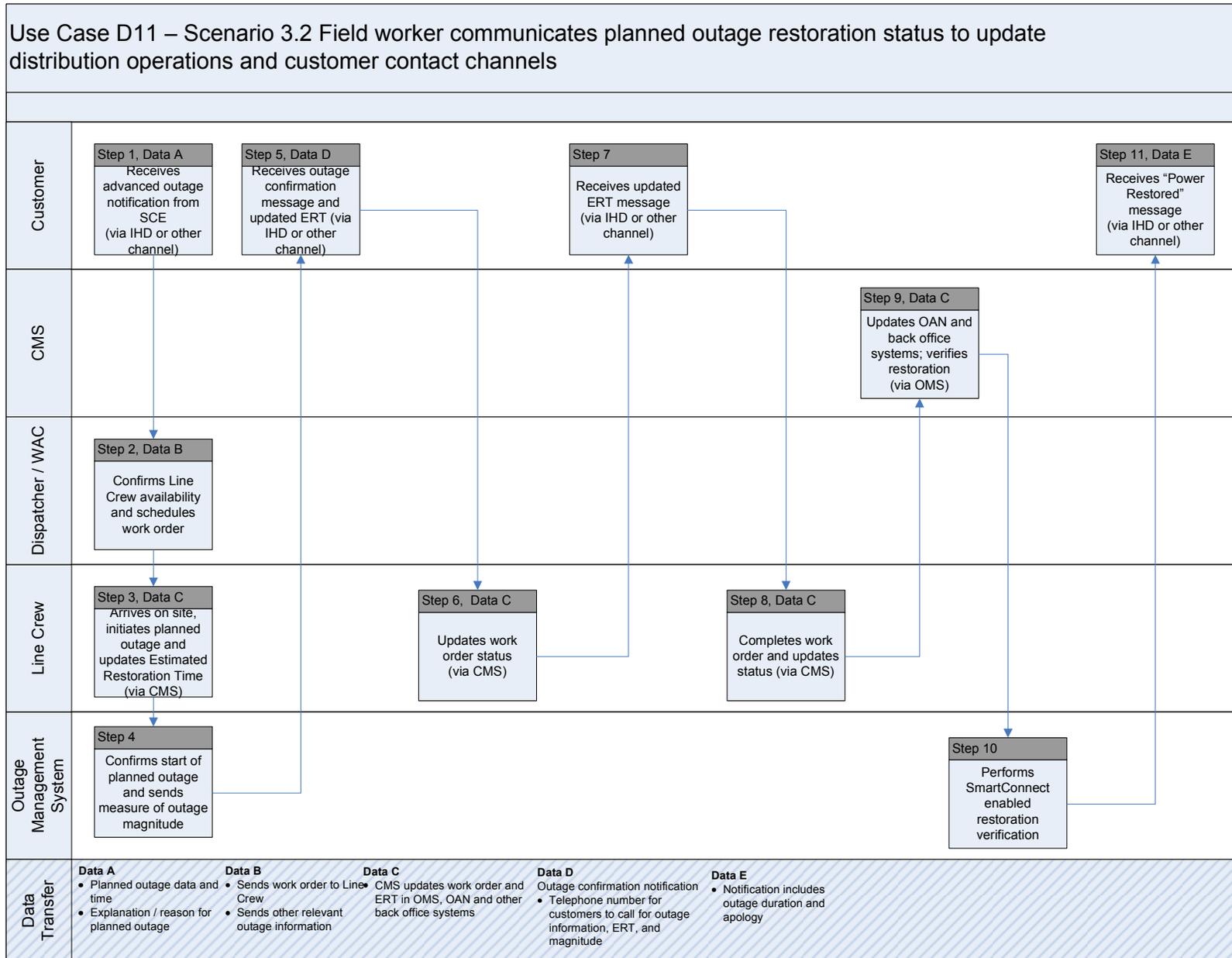
5. Use Case Models (optional)

This section is used by the architecture team to detail information exchange, actor interactions and sequence diagrams

5.1 Diagrams

Use Case D11 – Scenario 3.1 Field worker communicates unplanned outage restoration status to update distribution operations and customer contact channels





6. Use Case Issues

Capture any issues with the use case. Specifically, these are issues that are not resolved and help the use case reader understand the constraints or unresolved factors that have an impact of the use case scenarios and their realization.

<i>Issue</i>
<i>Describe the issue as well as any potential impacts to the use case.</i>
Need to overcome the potential reluctance of field workers to update work order statuses via CMS.
Need to develop capability within the Work Management System (WMS) to automatically calculate the estimated restoration time based on historical experience and the ability to capture real-time field conditions.

7. Glossary

Insert the terms and definitions relevant to this use case. Please ensure that any glossary item added to this list should be included in the global glossary to ensure consistency between use cases.

Glossary	
Term	Definition
Customer Service Representative (CSR)	Staff employed by the utility who respond to customer complaints, outage notifications, and customer requests to activate, modify and/or terminate delivery of service. CSR also enroll customers in utility-sponsored programs and answer questions related to customer energy consumption and cost data. Many off-cycle reading, billing, work orders and diagnostics requests are initiated by CSRs in response to customer contact.
Customer Service System (CSS)	<p>A system responsible for producing customer invoices from accurate "bill ready" SmartConnect meter readings. Invoices can be produced periodically (on cycle) or as a result of a specific event (off cycle). Accurate bills require accurate and timely information from the SmartConnect meters. The system is responsible for storing customer specific information like site data, SmartConnect meter numbers and rates and program participation. The system also tracks and manages customer invoices and payments.</p> <p>Maintains customer contact information, calculates and formats customer bills, receives, and applies payments for individual accounts. The system is responsible for storing customer information such as site data, meter number, rates, and program participation(s).</p>
Distribution Operations Center (DOC)	The Distribution Operations Center (DOC) is the location at which Operators monitor the distribution system, perform remote actions (i.e. operating switches), and take other actions on circuits to preserve grid stability. Dispatchers at the DOC dispatch Trouble Workers to perform trouble shooting and repair work. Work Assignment Coordinators assign and dispatch Line Crews to
Estimated Restoration Time (ERT)	The estimate of the time required to restore power to the customer.
Field Worker	Field personnel who perform planned maintenance and emergency repair activities on distribution assets. This could include Trouble Workers, Line Crews or E-Crew

D11 – Distribution Operations uses Smart Grid technology to enhance outage communication processes

	personnel.
In-Home Display (IHD)	<p>This device will enable customers to view their usage and cost data within their home or business. Data will be passed to this device via the SmartConnect Meter. Only utility-approved devices will be able to connect to the SmartConnect network and receive data and communications from SCE.</p> <p>The device shall be located at the customer site and be able to receive usage and cost information, text messages, and other energy information from the SmartConnect meter via Home-Area Network (HAN) communications. The device must meet SCE requirements (for communication to the HAN) to enable these capabilities.</p>
Voice Response Unit (VRU)	Automated telephone answering system responsible for first tier of response to customer outage calls.

8. References

Reference any prior work (intellectual property of companies or individuals) used in the preparation of this use case

9. Bibliography (optional)

Provide a list of related reading, standards, etc. that the use case reader may find helpful.